

We claim:

1. A method for reporting address information in a distributed communication system having a plurality of distributed address databases, wherein each address database includes a number of locally owned address entries containing locally owned address information and a number of remotely owned address entries containing remotely owned address information, the method comprising:

retrieving a list of locally owned address information from each of the distributed address databases;

sorting the retrieved address information according to a predetermined sorting scheme; and

reporting the sorted address information.

2. The method of claim 1, wherein:

each address database is maintained by one of a plurality of interconnected modules within the communication system, where each module includes a number of interfaces;

each locally owned address entry includes a locally owned address and an interface identifier identifying an interface from which the locally owned address is learned;

each remotely owned address entry includes a remotely owned address and a module identifier identifying a module from which the remotely owned address is learned.

3. The method of claim 2, comprising:

determining a reporting module from among the plurality of interconnected modules;

retrieving a list of locally owned address information by the reporting module from its address database;

retrieving a list of locally owned address information by the reporting module from each of the other interconnected modules;

sorting the address information by the reporting module according to a predetermined sorting scheme; and

reporting the sorted address information by the reporting module.

4. The method of claim 3, wherein retrieving the list of locally owned address information by the reporting module from its address database comprises retrieving a predetermined number of locally owned address entries from the address database.

5. The method of claim 4, wherein the locally owned address entries are maintained in lexicographical order by address, and wherein retrieving the list of locally owned address information by the reporting module from its address database comprises retrieving the predetermined number of locally owned address entries beginning with a first locally owned address entry that is lexicographically greater than a predetermined starting address.

6. The method of claim 3, wherein retrieving the list of locally owned address information by the reporting module from each of the other interconnected modules comprises:

causing a request message to be sent to each of the other interconnected modules requesting the list of locally owned address information from each of the other interconnected modules;

retrieving the list of locally owned address information by each of the other interconnected modules from its respective address database;

formatting a response message by each of the other interconnected modules including the list of locally owned address information; and

sending the response message by each of the other interconnected modules to the reporting module.

7. The method of claim 6, wherein retrieving the list of locally owned address information by each of the other interconnected modules from its respective address database comprises retrieving a predetermined number of locally owned address entries from the address database.

8. The method of claim 7, wherein the request message includes a predetermined starting address, and wherein retrieving the list of locally owned address information by each of the

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other interconnected modules from its respective address database comprises retrieving the predetermined number of locally owned address entries beginning with a first locally owned address entry that is lexicographically greater than the predetermined starting address.

5 9. The method of claim 2, wherein the address information comprises a number of address-to-port-number mappings, where each address-to-port-number mapping includes a locally owned address and a corresponding interface identifier.

10 10. The method of claim 9, wherein sorting the address information comprises sorting the address-to-port-number mappings into lexicographical order according to the locally owned address.

11 11. The method of claim 1, wherein the predetermined sorting scheme is a parallel sorting scheme.

15 12. The method of claim 11, wherein sorting the address information comprises:
maintaining an index/pointer for each list of locally-owned address information
retrieved from each of the distributed address databases;
setting the index/pointer for each list of locally-owned address information to indicate
20 a lexicographically lowest address entry in the list; and
outputting address entries in lexicographical order by iteratively determining an
index/pointer indicating a lexicographically lowest address entry, outputting the address entry
indicated by the index/pointer, and setting the index/pointer to indicate the lexicographically
next address entry in the list.

25 13. The method of claim 1, further comprising:
caching the retrieved address information in a cache memory; and
using the cached address information to report the address information.

14. A module for reporting address information in a communication system having a plurality of interconnected modules, the module comprising:

an address database;

address maintenance logic operably coupled to maintain a number of locally owned address entries containing locally owned address information and a number of remotely owned address entries containing remotely owned address information in the address database;

local retrieval logic operably coupled to retrieve a list of locally owned address information from the address database;

remote retrieval logic operably coupled to retrieve a list of locally owned address information from each of the other interconnected modules;

sorting logic responsive to the local retrieval logic and the remote retrieval logic and operably coupled to sort the retrieved address information according to a predetermined sorting scheme; and

reporting logic operably coupled to report the sorted address information.

15. The module of claim 14, wherein the local retrieval logic is operably coupled to retrieve a predetermined number of locally owned address entries from the address database.

16. The module of claim 15, wherein the address maintenance logic maintains the locally owned address entries in lexicographical order by address, and wherein the local retrieval logic is operably coupled to retrieve the predetermined number of locally owned address entries beginning with a first locally owned address entry that is lexicographically greater than a predetermined starting address.

17. The module of claim 14, wherein the remote retrieval logic comprises:
transmitting logic operably coupled to cause a request message to be sent to each of the interconnected modules requesting the list of locally owned address information from each of the other interconnected modules; and

receiving logic operably coupled to receive from each of the interconnected modules a

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response message including the list of locally owned address information from the interconnected module.

18. The module of claim 14, wherein the address information comprises a number of
5 address-to-port-number mappings, where each address-to-port-number mapping includes a locally owned address and a corresponding interface identifier.

19. The module of claim 18, wherein the sorting logic is operably coupled to sort the address-to-port-number mappings into lexicographical order by address.

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20. The module of claim 19, wherein the sorting logic is operably coupled to maintain an index/pointer for each retrieved list of locally-owned address information, set the index/pointer for each list of locally-owned address information to indicate a lexicographically lowest address entry in the list, and output address entries in lexicographical
15 order by iteratively determining an index/pointer indicating a lexicographically lowest address entry, outputting the address entry indicated by the index/pointer, and setting the index/pointer to indicate the lexicographically next address entry in the list.

21. The module of claim 14, further comprising caching logic operably coupled to store
20 the retrieved address information in a cache memory.

22. A program product comprising a computer readable medium having embodied therein a computer program for reporting address information in a communication system having a plurality of interconnected modules, the computer program comprising:

address maintenance logic programmed to maintain a number of locally owned
5 address entries containing locally owned address information and a number of remotely
owned address entries containing remotely owned address information in an address database;
local retrieval logic programmed to retrieve a list of locally owned address
information from the address database;

remote retrieval logic programmed to retrieve a list of locally owned address
10 information from each of the other interconnected modules;

sorting logic responsive to the local retrieval logic and the remote retrieval logic and
programmed to sort the retrieved address information according to a predetermined sorting
scheme; and

reporting logic programmed to report the sorted address information.

23. The program product of claim 22, wherein the local retrieval logic is programmed to
retrieve a predetermined number of locally owned address entries from the address database.

24. The program product of claim 23, wherein the address maintenance logic maintains
20 the locally owned address entries in lexicographical order by address, and wherein the local
retrieval logic is programmed to retrieve the predetermined number of locally owned address
entries beginning with a first locally owned address entry that is lexicographically greater
than a predetermined starting address.

25. The program product of claim 22, wherein the remote retrieval logic comprises:
transmitting logic programmed to cause a request message to be sent to each of the
interconnected modules requesting the list of locally owned address information from each of
the other interconnected modules; and

receiving logic programmed to receive from each of the interconnected modules a
30 response message including the list of locally owned address information from the

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interconnected module.

26. The program product of claim 22, wherein the address information comprises a number of address-to-port-number mappings, where each address-to-port-number mapping
5 includes a locally owned address and a corresponding interface identifier.

27. The program product of claim 26, wherein the sorting logic is programmed to sort the address-to-port-number mappings into lexicographical order by address.

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28. The program product of claim 22, wherein the sorting logic is programmed to maintain an index/pointer for each retrieved list of locally-owned address information, set the index/pointer for each list of locally-owned address information to indicate a lexicographically lowest address entry in the list, and output address entries in lexicographical order by iteratively determining an index/pointer indicating a lexicographically lowest address entry, outputting the address entry indicated by the index/pointer, and setting the index/pointer to indicate the lexicographically next address entry in the list.

29. The program product of claim 22, wherein the computer program further comprises caching logic programmed to store the retrieved address information in a cache memory.

30 A module for reporting address information in a communication system having a plurality of interconnected modules, the module comprising:

an address database;

address maintenance logic operably coupled to maintain a number of locally owned address entries containing locally owned address information and a number of remotely owned address entries containing remotely owned address information in the address database;

receiving logic operably coupled to receive a request message from a reporting module requesting locally owned address information;

address retrieval logic responsive to the receiving logic and operably coupled to retrieve locally owned address information from the address database;

response formatting logic responsive to the address retrieval logic and operably coupled to format a response message including the locally owned address information; and

transmitting logic responsive to the response formatting logic and operably coupled to send the response message to the reporting module.

31. The module of claim 30, wherein the address retrieval logic is operably coupled to retrieve a predetermined number of locally owned address entries from the address database.

32. The module of claim 31, wherein:

the request message includes a predetermined starting address;

the locally owned address entries are maintained in lexicographical order by address;

and

the address retrieval logic is operably coupled to retrieve the predetermined number of locally owned address entries beginning with a first locally owned address entry that is lexicographically greater than a predetermined starting address.

33. A program product comprising a computer readable medium having embodied therein a computer program for reporting address information in a communication system having a plurality of interconnected modules, the computer program comprising:

address maintenance logic operably coupled to maintain a number of locally owned address entries containing locally owned address information and a number of remotely owned address entries containing remotely owned address information in an address database;

receiving logic programmed to receive a request message from a reporting module requesting locally owned address information;

address retrieval logic responsive to the receiving logic and programmed to retrieve locally owned address information from the address database;

response formatting logic responsive to the address retrieval logic and programmed to format a response message including the locally owned address information; and

transmitting logic responsive to the response formatting logic and programmed to send the response message to the reporting module.

34. The program product of claim 33, wherein the address retrieval logic is programmed to retrieve a predetermined number of locally owned address entries from the address database.

35. The program product of claim 34, wherein:

the request message includes a predetermined starting address;

the locally owned address entries are maintained in lexicographical order by address;

and

the address retrieval logic is programmed to retrieve the predetermined number of locally owned address entries beginning with a first locally owned address entry that is lexicographically greater than a predetermined starting address.

36. A communication system comprising a reporting module in communication with a number of other interconnected modules, wherein each of the modules maintains an address database including a number of locally owned address entries containing locally owned address information and a number of remotely owned address entries containing remotely owned address information, and wherein the reporting module reports address information by retrieving locally owned address information from its address database, retrieves locally owned address information from each of the other interconnected modules, sorts the address information according to a predetermined sorting scheme, and reports the sorted address information.

$$\begin{aligned} & \left\{ \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2} - \frac{\partial^2}{\partial t^2} \right\} u = 0 \\ & \text{where } u(x,y,z,t) \text{ is the unknown function.} \end{aligned}$$